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the Description of *Dyscritaspis whartoni*, a new Genus
and Species of Polyaspid Mite from Tree Holes**

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A Revision of the Cohort Trachytina Trägårdh, 1938, with the Description of *Dyscritaspis whartoni*, a new Genus and Species of Polyaspid Mite from Tree Holes

Joseph H. Camin

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During the autumn of 1952 and the spring of 1953, large numbers of free-living mites representing a new genus and species of the cohort Trachytina were collected from basal tree holes in basswood trees a few miles north of Des Plaines, Illinois. A review of the available literature and the study of other representatives of this cohort soon made it evident that this group and its member families and genera were badly in need of clarification and some revision.

Much of the data herein presented were made available through the kind cooperation of several individuals. I wish to thank Dr. George W. Wharton, University of Maryland, for valuable suggestions and critical reading of this paper; Dr. Edward W. Baker, United States National Museum, for the loan of several specimens of *Polyaspis* and *Trachytes*; Miss Flora E. Gorirossi, University of Maryland, for invaluable data and drawings of the type specimens in the Berlese collection; Dr. G. Owen Evans, British Museum, for data on the holotype specimen of *Calotrachytes sclerophyllus* and the loan of a female specimen of *Dipolyaspis sansonei*; and Dr. Frank A. Turk of England for the loan of an excellent female specimen of *Polyaspinus cylindricus*.

HISTORICAL REVIEW

The cohort Trachytina was erected in 1938 by Trägårdh to include the families Trachytidae Trägårdh, 1938, and Polyaspidae Berlese, 1918. In 1941 Trägårdh created the family Polyaspinidae for *Polyaspinus*

cylindricus Berlese, 1917, and included it in the cohort Trachytina also. In this paper he characterized the cohort Trachytina as follows:

"Tritosternum with broad and short trunk, interposed between coxae I. Metasternal shield in the female not fused with the sternal and ventral shields, situated on both sides of the epigynial shield. Mandibles of the *Uropodine-type*. Dorsal side covered by nymphal skins."

Summarizing his monumental studies on the comparative morphology of the Mesostigmata, Trägårdh (1946) modified the diagnosis of the cohort Trachytina to read:

"Male genital aperture in the middle of the sternal shield. Metasternal shields free, situated on both sides of the genital aperture. Tritosternum with short and broad trunk. Epigynial shield without hair. Mandibles long and slender, of the *Uropodine* type. Dorsal side covered by nymphal skins."

In this same paper (1946), he gave diagnoses of the three families of the cohort Trachytina. These were as follows:

Family Trachytidae Trägårdh, 1938. "Metasternal shields narrow, elongated, flanking the sides of the epigynial shield, which is articulated to the ventral shield and has no hairs. *Type: Trachytes* Michael 1894. *T. aegrota* (K)."

Family Polyaspididae Berlese, 1918. "Metasternal shields of the same shape as in the *Trachytidae*. Epigynial shield not articulated to the ventral shield, with one pair of marginal hairs on the border between the two shields. *Type: Polyaspis* Berlese 1881. *P. patavinus* Berl."

Family Polyaspinidae Trägårdh, 1941. "Metasternal shields very small, situated in the posterior angles of the genital aperture. Epigynial shield without hairs articulated to the ventral shield. *Type: Polyaspinus* Berlese 1917. *P. cylindricus* Berl."

It will be noted that Trägårdh separated the three families on the basis of the metasternal shields and the epigynial shields of the females.

POLYASPIS AND DIPOLYASPIS

Gorirossi's data and drawings of the type specimen of *Polyaspis patavinus* reveal that Berlese (1881), unfortunately, described this species from at least two different species of closely related mites. In a later amplification of this original description, Berlese (1882) included figures of two quite different genital areas. It is fairly certain that one of these figures (reproduced here, Pl. I, 1), although lacking in some detail, was drawn from the type specimen because it compares very favorably with Gorirossi's drawings of that specimen (see Pl. I, 3). Berlese's second drawing (Pl. I, 2) of an epigynial shield and the surrounding area, along

with most of the remaining figures, appears to be from another species, which has apparently never been named. I will not attempt to name this form, however, until a more thorough investigation of the literature can be undertaken and a fuller description given.

Two female specimens (Pl. I, 4) from Portugal, appear to be very similar to the second species that Berlese had before him and these are probably representatives of that species. Another female from Tampa, Florida, is very similar to the Portuguese specimens, but possesses several differences indicating that it is a very closely related species of the same genus. Several nymphs and males were collected from tree holes in the Duke Forest near Durham, North Carolina and these appear to be some of the other stages of the Florida species. Very recently large series of mites, representing all stages of the Florida-Carolina species, were obtained from basal tree holes in Louisiana and Mississippi. A detailed description of this species is now in preparation.

In selecting the diagnostic characters for the genus *Polyaspis* Berlese, 1881, data were compiled from the descriptions and figures of Berlese, from the drawings of the type of *P. patavinus* by Gorirossi, and from studies of the aforementioned material from Portugal, Florida, North Carolina, Louisiana and Mississippi. In discussing these data, they will be associated with the specimens from which they were gathered in the event that it becomes necessary, in the future, to further subdivide the genus *Polyaspis*.

The genus *Polyaspis* possesses many distinctive features, the most striking of which is the placement of the metasternal setae on a pair of minute platelets flanking the posterolateral angles of the epigynial shield. This is true of the type (Pl. I, 3) and those from Portugal (Pl. I, 4) and Florida. The epigynial shield, in all specimens examined, is located between coxae III and IV. It is almost square, but with rounded corners, and is ornamented with scale-like sculpturing. In the specimens from Portugal and Florida the anterior edge of this shield is thickened and heavily sclerotized. The epigynial shield has no distinct articulation to the ventral surface, there being no membranous or soft cuticle between it and the sclerotized portion of the ventral surface directly behind it. However, the shield is clearly hinged to the venter along its posterior margin.

Immediately anterior to the genital aperture, the posterior margin of the sternal shield forms a raised crescentic rim which extends laterally and posteriorly, bordering the genital aperture on three sides. The anterior margin of the epigynial shield, when closed, rests on the edge of this rim and conceals its posterior margin, but the rim extends far enough forward so that never more than one-third of its length is covered by the epigynial shield. The rim always bears the third pair of sternal setae and a pair of pseudosternal setae. In the species from Florida and Portugal (Pl. I, 4),

but not in *P. patavinus* (Pl. I, 3), sternal setae II are also present on the anterior border of the perigenital rim. The specimens from Portugal and Florida further differ from *P. patavinus* in the placement of the pseudosternal setae and the metasternal setae and plates. The pseudosternal setae of *P. patavinus* are placed at the anterior corners of the epigynial shield and are much closer to sternal setae III than they are to the metasternal setae, which are on very small platelets behind the posterior angles of the epigynial shield. In the other two species, the pseudosternal setae are on the posterolateral extensions of the rim approximately one-third the length of the epigynial shield behind the anterior margin of the epigynial shield. They are approximately equidistant between the third sternal setae and the metasternal setae or somewhat closer to the metasternal setae, which flank the lateral margins of the epigynial shield approximately one-third the length of that shield anterior to its posterior border.

In all specimens and descriptions of *Polyaspis* spp. that were studied, although the pseudosternal and the metasternal setae are often somewhat reduced in size, the third sternal setae are approximately equal in length to sternal setae I and II. Sternal setae III are usually placed closer to the anterior margin of the perigenital rim than to the genital aperture. Sternal setae I are located just posterior to the anterior margin of the sternal shield, usually on a slightly raised mound.

It will be noted in this discussion that there are five pairs of intercoxal or sternal setae on the mites under examination. It will be noted, furthermore, that the fourth pair of setae are referred to as "pseudosternals," as Trägårdh called them. The term "pseudosternal" appears to be ill-chosen in that it implies that these setae are secondary structures and of little or no consequence. In fact they are very stable characters throughout the Trachytina and the Uropodina and are present in many species in which the fifth or metasternal setae are lacking, as Trägårdh demonstrated. It cannot be stated with any degree of certainty at the present time, whether the fourth or fifth pair of setae are the homologues of the metasternal setae of other mesostigmatid mites. However, the close association of sternal pores III with the fifth pair of setae strongly suggests that these setae are homologous with the fourth pair or metasternals of the Gamasides and other groups. For this reason the term "metasternal" will continue to be used with reference to the posterior pair of sternal setae and "pseudosternal" for the pair anterior to these.

The metapodal shields of *Polyaspis* spp. are very large and free medially, but are apparently fused with the parapodal and peritremal plates laterally. The anal shield is very broad and the anal pore with its two pairs of adanal setae and single postanal seta is located on a rudder-like projection from the anal shield. The peritremes of the adult females are very short and somewhat recurved, located on lateral projections from the

*In discussing the gnathosoma, the terminology of Gorirossi and Wharton (in press) is used in this paper

body extending from the stigmata between coxae III and IV to the middle of coxae III. The tritosternum has a broad, somewhat triangular base with a single three-branched lacina, each branch clothed with long, fine setules.

According to Berlese's descriptions and Gorirossi's drawings of *Polyaspis patavinus*, the dorsum of this species is covered by a large median dorsal shield, which possesses the typical trachytine, longitudinal, median furrow. No posterior dorsal shield is present and each of the marginal and submarginal setae is placed on a separate platelet. The Portuguese and Florida specimens each possess a very small posterior dorsal shield. This shield is less than one-tenth the length of the median dorsal shield, although it is almost as wide, and is very difficult to discern as a separate shield unless the specimen is cleaned of debris and sufficiently cleared. Miss Gorirossi has informed me that many characters on the specimens of trachytine mites in the Berlese collection were impossible to discern with certainty. It is therefore possible that *P. patavinus* also possesses the posterior dorsal shield and that it cannot be distinguished on the type specimen.

The legs of *Polyaspis* are covered with rough, fimbriate growths. Leg I lacks a pretarsus and claws, but possesses a long tactile seta and several other setae of various types. Among these are two rather strong, conspicuous setae with spatulate tips (Pl. I, 7). They are located near the distal end of the tarsus, one dorsal and the other ventrolateral. Each of the other legs possesses a pretarsus with claws and caruncle. The claws are relatively strong and recurved. The caruncle is rather peculiar in structure, consisting of a long, pointed, median projection ventrally between the claws and a large, dorsal cushion, that is tulip-like in form and possesses two small, drop-shaped, retractable projections at its anterior margin.

The gnathosomal setae* of *P. patavinus* and the other *Polyaspis* spp. are short, branched and spinose. The median hypostomal setae are also short and spinose, but not branched. The proximal hypostomal setae are long and whip-like, reaching to the base of the palpal tibiae or beyond. The distal hypostomal setae are similar to these, but only about one-half to two-thirds the length of the proximal setae. The hypostomal processes are long, extending to the middle of the palpal genu, and are covered with setules on the distal third. The corniculi are very long, blade-like, and heavily sclerotized. They reach beyond the base of the palpal tibia, almost to the base of the two-tined palpal seta. A pair of long, slender, salivary styli is present. These usually cross each other above the hypostomal processes. The pedipalps are only four-segmented, excluding the palpal coxae. The palpal tibiae and tarsi are insensibly fused, their line of fusion being marked only by the position of the two-tined tarsal seta. The tectum

consists of a long, slender median tongue-like structure, which is covered with minute denticles, and a pair of shorter, spinose projections laterally. The chelicerae are very long as in the Uropodina. The cheliceral digits are large, strong and almost equal in length. They possess a few strong teeth at their tips and there are pockets in the fixed digit, which receive the opposing teeth of the movable digit.

The males and nymphal stages from North Carolina, Louisiana, and Mississippi are quite similar in many details to the females already described. In the male all of the ventral shields are fused. The genital aperture is small, round and located between the third and fourth coxae. The dorsum, legs and gnathosoma are like those of the female from Florida. The dorsum of the protonymph is covered by four major shields. The median dorsal shield is the largest. This shield is narrowed in its posterior third to form a narrow border around the edges of the longitudinal median dorsal furrow. On each side of the narrowed portion of the median dorsal shield there lies an elongate oval shield and the small posterior dorsal shield lies in the posterior tenth of the dorsum. This is very similar to the condition found in many nymphal uropodine mites. The dorsum of the "deutonymph" is essentially the same as that of the protonymph, except that the median dorsal shield and the pair of lateral dorsal shields have expanded and appear, at first glance, to have fused into a single median dorsal shield. In the "tritonymph" all four of these shields have fused to form a single shield covering most of the dorsum. The peritremes of both the "deutonymph" and "tritonymph" are much elongated, extending almost to the middle of coxae II. The anus and associated setae of the "tritonymph" are surrounded by a sclerotized ring similar to that found in the phoretic nymphs of the Uropodina. Indeed, one nymph from White County, Arkansas, was found attached to a passalid beetle by means of a typical uropodine anal pedicel. The caruncles of these phoretic nymphs also differ from those of all other stages, being large and flower-like without the ventral, pointed structure or the drop-like anterior projections. In all of the nymphal stages the metapodal shields are somewhat reduced, the anus is surrounded by a large anal shield and a rough areolate sternal shield occupies the space between the anterior margins of coxae II and the anterior margins of coxae IV. The sternal shield possesses the first three pairs of sternal setae, the pseudosternals and metasternals being located on the soft integument or on very small platelets.

On the basis of the foregoing discussion a brief diagnosis of the genus *Polyaspis* can be formulated. In putting forth generic diagnoses in this paper it will be assumed, of course, that each genus discussed also possesses the characters of the cohort Trachytina and of the family to which it is assigned. These characters will be discussed following the review of the genera.

*In discussing the gnathosoma, the terminology of Gorirossi and Wharton (in press) is used in this paper

Genus *Polyaspis* Berlese, 1881

Diagnosis. Metasternal setae on minute shields flanking posterior angles of epigynial shield; epigynial shield square with rounded corners, between coxae III and IV, extending from the middle of coxae IV to slightly behind anterior margins of coxae III. Perigenital rim long anteriorly, less than one-third covered by epigynial shield; sternal setae III equal in length to I and II, placed closer to anterior border of rim than to genital aperture; setae II sometimes on anterior border of rim; pseudosternals on lateral extensions of rim. Metapodal shields large, free medially, but usually fused with parapodal and peritremal plates laterally. Ventral opisthosoma with two pairs of leaf-like metapodal setae, two pairs of ventral setae between metapodal shields and two pairs of ventral setae, in a transverse row, between metapodal and anal shields. Tritosternal lacina with three long branches, with long setules. Peritremes short, recurved, extending from stigmata between coxae III and IV to middle of coxae III. Large median dorsal shield covering most of dorsum, setae in longitudinal furrow and on margins of shield approximately one-half the length of marginal setae; usually with minute posterior dorsal shield, less than one-tenth the length of median dorsal shield and without setae; marginal setae on soft integument or on individual marginal platelets. Corniculi long, blade-like, reaching beyond proximal margins of palpal tibiae. Cheliceral digits subequal, with few strong teeth; fixed digit with pockets receiving opposing teeth of movable digit. Palpal tibiae and tarsi insensibly fused. Ventral shields of male fused, covering venter. Sternal shield of nymphs with only three pairs of setae, pseudosternal and metasternal setae on soft integument.

Type: *Polyaspis patavinus* Berlese, 1881.

In setting forth the diagnostic characters of the family Polyaspidae, Trägårdh (1941) made a comparison of his figure of "*Polyaspis* sp." (1938, p. 129, fig. 8, reproduced here, Pl. I, 5) with one of the figures given by Berlese in his description of *Polyaspis patavinus* (1882, fig. 3, see Pl. I, 2). This figure represents the still unnamed species mentioned above and is *not* the type of *P. patavinus*. Trägårdh wrote:

"B. has not noticed that hairs II and III are inserted on the rim of the sternal shield because he has not observed this rim, which is indeed often hidden by the edges of the epigynial shield. In one important point the agreement is however, very good, because his figure shows the narrow metasternal shields with their hair, placed exactly as in my figure. The transverse, curved line which B. draws as the anterior edge of the epigynial shield is situated on the inner side of the shield. Finally B. draws only one pair of hairs at the posterior end of the epigynial shield but omits

one pair on the border between the posterior end of the shield and the perigenital rim."

A study of the Portuguese specimens of *Polyaspis*, which are very similar to if not the same as the second species used by Berlese in describing *P. patavinus*, reveals that Trägårdh misinterpreted Berlese's drawings. Berlese drew sternal setae II and III on the anterior edge of the rim of the sternal shield exactly as they are. In *Dipolyaspis*, this rim is narrow and is, indeed, "often hidden by the edges of the epigynial shield." However, in *Polyaspis* the rim is much longer and only the posterior edge of it is covered by the epigynial shield, as Berlese figured it. Trägårdh apparently interpreted the perigenital rim as the anterior part of the epigynial shield in Berlese's figure and, therefore, was confused by Berlese's placement of sternal setae II and III on the surface of what he had considered to be the epigynial shield. The "narrow metasternal shields" that Trägårdh mentioned are the lateral posterior extensions of the perigenital rim and the setae are not the metasternals, but the pseudo-sternal setae. The "transverse, curved line which B. draws as the anterior edge of the epigynial shield" is exactly that. The line on the inner side of the shield, referred to by Trägårdh, does occur posterior to this and was not figured by Berlese. Trägårdh's "*Polyaspis* sp." apparently has an epigynial shield that is much more elongate than that of Berlese's *Polyaspis*. Finally, Berlese apparently did omit one pair of setae. These are very small and occur on a pair of much reduced shields flanking the posterior angles of the epigynial shield. They are the true metasternal setae on the metasternal shields, which are very similar to those of *Polyaspinus cylindricus*. In fact it will be noted that, according to Trägårdh's diagnoses, the genus *Polyaspis* fits more readily into the family Polyaspinidae than the Polyaspidae, of which it is the type genus.

The source of Trägårdh's error becomes obvious when his 1938 figure of "*Polyaspis* sp." (Pl. I, 5) is compared with *Dipolyaspis sansonei* (Pl. I, 6). It is fairly evident that his drawing was of a mite that is also a member of the genus *Dipolyaspis* and not the genus *Polyaspis*. It must be assumed then, as is apparent from his diagnosis of the family, that Trägårdh actually based the Polyaspidae on the genus *Dipolyaspis* alone and probably never had the opportunity to study a good specimen of *Polyaspis*.

The genus *Dipolyaspis* was proposed by Berlese (1917c) as a new subgenus of the genus *Polyaspis*, but has been considered by subsequent authors to be of generic rank. The characters of this genus are summarized in the following diagnosis.

Genus *Dipolyaspis* Berlese, 1917

Diagnosis. Metasternal shields narrow, elongate, approximately one-half the length of epigynial shield, at lateral margins of genital aperture. Epigynial shield elongate oval; extending from a point approximately one coxal diameter behind coxae IV to the posterior margins of coxae II; posterior origin hidden by rim around genital aperture. Perigenital rim narrow, completely surrounding genital aperture; hidden anteriorly under epigynial shield; sternal setae III equal in length to I and II, placed on rim flanking anterolateral margins of epigynial shield. Pseudosternal setae represented only by setal bases, usually on rim between coxae III and IV. Metapodal shields large, fused to each other medially, forming a broad band across venter. Anal shield large, separate. Fused metapodals with two pairs of metapodal setae and two pairs of ventral setae. Two pairs of ventral setae in transverse row along anterior margin of anal shield. One pair of strong setae on posterolateral corners of epigynial shield. Tritosternal lacina with four short branches, lacking setules. Peritremes extending from stigmata between coxae III and IV to middle of coxae II. Dorsal median shield covering two-thirds of dorsum, setae in longitudinal furrow and on margins of shield leaf-like and approximately one-third the length of marginal setae; posterior dorsal shield of moderate size, approximately one-fifth the length of median dorsal shield. Marginal setae leaf-like, on small individual platelets. Corniculi moderately long, bladelike, reaching to or beyond distal margins of palpal femora. Fixed digit of chelicera slightly longer than movable digit and with hooked tip. Palpal tibiae and tarsi insensibly fused. Anal shield of male large and separate as in female.

Type: *Polyaspis* (*Dipolyaspis*) *sansonei* Berlese, 1917.

It will be noted that the two setae on the epigynial shield, which Trägårdh called "ventral" setae, have no homologues in the genus *Polyaspis*. These are, in fact, the only setae, ventrally or dorsally, that cannot be accounted for by homologous setae in *Polyaspis*. The origin of these "epigynial" setae cannot be explained by the data now available, but it is suggested that these may be homologous with the genital setae of the Gamasides and the Zerconina.

CALOTRACHYTES

The genus *Calotrachytes* was also erected by Berlese (1917a) as a subgenus of *Polyaspis*. This proposal was not accompanied by a generic diagnosis. Berlese merely designated the type species of the genus and an additional species. Both species included in *Calotrachytes* had been described by Michael (1908) from New Zealand. Berlese designated

Michael's *Trachynotus sclerophyllus* as the type and added *Trachynotus fimbriatipes* as a second species at the time he proposed the name *Calotrachytes*. A year later, in his "Intorno agli Uropodidae," Berlese (1918) listed *Calotrachytes* with *Trachynotus fimbriatipes* Michael, 1908, as the type and this error has been carried on by other authors since that time. *Trachynotus sclerophyllus* Michael, 1908, of course remains as the type species of the genus *Calotrachytes* by original designation.

From Michael's descriptions and figures of these two species it is fairly obvious that they are not members of the same genus. However, until a more thorough study of the type of *T. fimbriatipes* is undertaken, the proper placement of this species in the family Polyaspididae cannot be accurately determined.

The following diagnosis is based on Michael's description and figures and the invaluable data on the holotype specimen of *Calotrachytes sclerophyllus* (Michael) very kindly supplied by Dr. G. Owen Evans.

Genus *Calotrachytes* Berlese, 1917

Diagnosis. Metasternal setae on small metasternal shields behind posterolateral margins of epigynial shield, within perigenital rim. Epigynial shield rectangular with rounded corners, slightly longer than broad; extending from behind anterior margins of coxae **IV** almost to middle of coxae **II**; apparently articulated within perigenital rim, anterior to metasternals. Genital aperture completely surrounded by narrow perigenital rim, which bears sternal setae **II** and **III** and the pseudosternals. Sternal setae **I** on sclerotized anterior margin of sternal shield. Metapodal and anal shields fused, forming a single shield covering ventral opisthosoma; with transverse row of four very large ventral setae anterior to anus. Tritosternal lacina with several short branches, without long setules. Peritremes extending from stigmata opposite coxae **III** to middle of coxae **II**, then directed outward to margins of body. Dorsal median shield covering most of dorsum; posterior dorsal shield small, little more than one-tenth the length of median dorsal shield, without setae. Marginal setae very large, leaf-like, free or on independent platelets. Corniculi moderately long, blade-like, reaching slightly beyond distal margins of palpal femora. Chelicerae as in *Dipolyaspis*; fixed digit slightly longer than movable digit and with hooked tip. Palpal tibiae and tarsi insensibly fused. Male and immature stages unknown.

Type: *Trachynotus sclerophyllus* Michael, 1908.

DYSCRITASPIS

In the autumn of 1952 a new species of mite, representing a fourth genus of the family Polyaspididae, was found to be abundant in samples of tree-hole mold from the Cook County Forest Preserve 2.5 miles north of Des Plaines, Illinois. This genus is most closely related to *Polyaspis*, but possesses many distinctive characters which prohibit its inclusion in that genus. It can be characterized in the following manner.

Genus *Dyscritaspis* new genus

Diagnosis. Metasternal shields fused with epigynial shield, metasternal setae and sternal pores III on posterior corners of epigynial shield; epigynial shield extending from middle of coxae IV to slightly behind anterior margins of coxae III, square with rounded corners. Perigenital rim long, less than one-third covered by epigynial shield; sternal setae III much reduced, on posterior margin of rim mediad to pseudosternal setae, often hidden by anterior edge of epigynial shield. Metapodal shields large, free medially and laterally. Ventral opisthosomal setae as in *Polyaspis*. Tritosternal lacina with five long branches, with long setules. Peritremes short, recurved, extending from stigmata between coxae III and IV to middle of coxae III. Large median dorsal shield covering most of dorsum, setae in longitudinal furrow and on margins of shield much less than one-half the length of marginal setae; with minute posterior dorsal shield, less than one-tenth the length of median dorsal shield and without setae; inner marginal platelets fused to form several larger marginal shields, each bearing several setae. Stout dorsal and ventrolateral setae of tarsus I with broom-like tips. Corniculi long, blade-like, reaching beyond proximal margins of palpal tibiae. Cheliceral digits subequal, with few strong teeth; fixed digit with pockets receiving opposing teeth of movable digit. Palpal tibia and tarsus insensibly fused. Ventral shields of male fused, covering venter. Sternal shield of "deutonymph" and "tritonymph" with four pairs of setae, metasternal setae on soft integument.

Type: *Dyscritaspis whartoni* new species.

The generic name, *Dyscritaspis*, is formed from two Greek words, *dyskritos* and *aspis*, meaning "difficult to distinguish or interpret" and "shield." The name refers to the shield formed by the fusion of the metasternal shields and the epigynial shield. Unless the pair of setae at the posterior angles of the shield are studied closely, they can be easily mistaken for a pair of genital setae, such as occur on the epigynial shields of the Gamasides or the Zerconina, or perhaps the genus *Dipolyaspis*. Close observation, however, reveals the presence of the third sternal pores in close association with these setae and indicates their true identity as metasternal setae. Thus, the metasternal shields are shown to be fused with the epigynial shield, a condition that is apparently unique for the entire suborder.

Dyscritaspis whartoni new species*

Description. Body rough, fimbriate anteriorly; boat-shaped in life (although not as distinctly so on mounted specimens under the pressure of a cover glass); vertex projecting anteriorly to a point; posterior end truncate; flat or slightly concave dorsally; convex ventrally; anus on rudder-like projection; peritremes projecting laterally, resembling oarlocks (Pl. II, 1, 2, and 3).

ADULT FEMALE, Plate III. Body averaging 720 x 520 μ , rough, dark brown, robust and slow-moving. Some critical measurements are presented in Table I.

Venter. Sternal shield fused with endopodals; extending laterally around epigynial shield and coxae IV to fuse with parapodal and peritremal plates; with rough, areolate margins; perigenital rim, a raised crescentic portion of sternal shield, extending from anterior margin of genital aperture forward to posterior margins of coxae II and posteriorly around lateral edges of genital aperture. Sternal setae I of moderate length on oval mound near anterior margin of sternal shield between anterior margins of coxae II, sternal pores I on this mound slightly behind sternal setae I; sternal setae II almost equal in length to setae I, on smoother part of shield, on line with anterior margin of perigenital rim, slightly laterad to setae I; sternal pores II not observed. A pair of double pores flanking rim at level of anterior margins of coxae III; round with slit-like openings and not to be confused with sternal pores, which are slit-like with round apertures. Sternal setae III much reduced, approximately one-half the length of I and II, in center of posterior margin of perigenital rim; flanked by pseudosternal setae of same length as sternals III; posterior margin of rim with sternal setae III and pseudosternal setae usually hidden by forward edge of epigynial shield. Epigynial shield free anteriorly and laterally, hinged posteriorly because of thickness, but not distinctly articulated to ventral surface; square with rounded corners, covered with scale-like sculpturing. Metasternal setae equal in length to sternal setae III, located near edges on posterior third of epigynial shield; sternal pores III anterolateral to metasternal setae; a round pore with slit-like opening laterad to each metasternal seta and posterior to sternal pore III (Pl. II, 5). Median shield present on dorsal wall of vagina, visible only after removal of epigynial shield, closing anterior half of genital aperture, with irregular group of round pores with slit-like

* This species is named for Dr. George W. Wharton whose enthusiastic and effective teaching of the special course in Acarology at Duke University and whose important contributions to an understanding of the Acarina have stimulated and inspired many students in this field.
In this and following tables, measurements were made on ten randomly selected specimens of the stage concerned. \bar{X} = mean; S = standard deviation.

openings on posterior margin (Pl. II, 14). Metapodal shields very large, roughly oblong in shape, with areolate lateral and posterior borders and a transverse curved line of pits from outer anterior corner to a point one-third the length of the shield behind the inner anterior corner on the inner lateral margin. A pair of contiguous round pores at inner anterior tip of metapodal shield; metapodal seta I of moderate length, leaf-like, directly behind pores; metapodal setae II slightly longer than I, leaf-like,

Table 1*. *D. whartoni*, Measurements of the Female

Part measured	\bar{x}	s	Range observed
Body:			
length	720.73 μ	40.34 μ	636.64-787.52 μ
width	521.27	30.96	486.68-562.12
Epigynial shield:			
length	149.80	5.66	142.12-156.64
width	151.47	4.62	143.88-159.94
Median dorsal shield:			
length	642.25	36.21	592.48-699.20
width	280.42	13.82	262.20-301.76
Posterior dorsal shield:			
length	51.48	4.81	43.34-60.50
width	218.15	11.09	201.52-236.72
Peritreme	67.17	5.92	58.30-76.78
Legs:			
I	536.64	19.38	494.04-557.52
II	511.06	21.68	459.08-540.96
III	460.37	12.82	436.08-474.72
IV	505.91	15.35	465.52-517.04
	\bar{x}		\bar{x}
Perigenital rim, depth of anterior margin	69.30 μ	Setae: tarsus I, long seta dorsal:	86.15 μ
Tritosternum:		marginal	64.57
base:		vertical	53.70
length	46.31	furrow	23.80
width	110.13		
lacina:		sternal:	
length	66.24	I	40.28
Chelicerae:		II	36.54
fixed digit	113.92	III	20.13
movable digit	113.21	pseudosternal	20.10
		metasternal	21.80
Corniculus:			
length	123.27	ventral I	26.97
Pretarsi:		metapodal	44.57
II	29.02		
III	25.72	anal:	
IV	28.07	adanal	24.46
		postanal	34.78

* In this and following tables, measurements were made on ten randomly selected specimens of the stage concerned. \bar{X} = mean; S = standard deviation.

in center of shield. Anal shield broad, areolate; with triangular, relatively smooth, rudder-like projection, bearing anus, two pairs of small adanal setae, and larger, leaf-like postanal seta. Ventral shield behind epigynial shield reduced to a narrow band; ventral setae I small, behind epigynial shield, on a line with anterior corners of metapodal shields, in soft integument; ventral setae II small, in soft integument at inner posterior edges of metapodal shields, ventral setae III and IV larger, leaf-like, on small platelets between posterior margins of metapodal shields and anterior border of anal shield. Tritosternum with broad triangular base and five-branched, tree-like lacina. Peritremes short, slightly recurved, extending from stigmata between coxae III and IV to middle of coxae III, on lateral projections from body (Pl. III, 2 and P1. II, 9).

Dorsum. Anterolateral margins rough, fimbriate. Vertex with four narrow lamellae, with thickened central ribs, extending forward; four or more broad anterolateral lamellae; lamellae extending roof-like over retracted gnathosoma; one pair of vertical setae, leaf-like, short. Median dorsal shield large, covering most of dorsum; with longitudinal median furrow extending most of its length; margins with adherent, areolate, nymphal skins; large leaf-like first inner marginal setae at anterior margin; two pairs of leaf-like setae of moderate length along posterior margin; six pairs of small peg-like setae in furrow; four or five pairs of small peg-like setae along lateral margins of shield. Posterior dorsal shield small, less than one-tenth the length of median dorsal shield, crescentic, covered with areolate nymphal skin, without setae. Thirteen pairs of large, leaflike, inner marginal setae, including first pair on median dorsal shield; nine pairs of large leaf-like, outer marginal setae, one pair plume-like terminal setae; outer marginal setae all on soft integument or on individual, minute platelets; inner marginal platelets enlarged, some fusing to form marginal shields with two or more setae, with adherent, areolate nymphal skins. Pattern usually with inner marginal platelets II and III; IV and V; VI, VII, VIII and IX fused as three marginal shields, platelet X enlarged, XI, XII and XIII equal to or only slightly larger than outer marginal platelets. Fusion pattern not always symmetrical and often with some variation from usual pattern. Some with platelets II and III independent, some with II, III, IV and V fused or with X fused to IX (Pl. III, 1). Marginal setae all leaf like, but with three vanes, one clear and two ribbed (P1. II, 13). Soft integument with strong, sometimes jagged striations.

Gnathosoma. Gnathosomal base short and broad; gnathosomal setae short, spinose, with one short, thick branch; three pairs of irregularly placed combs of deutosternal teeth. Pedipalps only four-segmented, excluding the palpal coxae; with tibiae and tarsi insensibly fused; forked

* In this and following tables, measurements were made on ten randomly selected specimens of the stage concerned. \bar{X} = mean; S = standard deviation.

seta of tarsus with two times of equal length; trochanter with two large, spiny setae ventrally; femur with one short, simple seta ventrally, three simple setae dorsally and a large spiny seta laterally, genu with two or three simple setae dorsally; tibia-tarsus with two large, spiny setae, one ventral and one lateral, four very long simple setae and many short simple setae. Proximal hypostomal seta long, simple, but with minute teeth on proximal third, reaching to distal margin of palpal genu; median hypostomal seta short, spiny, reaching only slightly beyond anterior margin of hypostome; distal hypostomal seta simple, approximately one-half the length of proximal seta; hypostomal processes long, slender, with serrate margins distally, reaching to middle of palpal genu. Corniculi extremely long, reaching beyond proximal margins of palpal tibiae-tarsi, blade-like, heavily sclerotized; salivary styli long, slightly longer than proximal hypostomal setae, needle-like, crossing each other medially (Pl. II, 12). Tectum with lateral, spiny processes, extending to middle of palpal femur, and long, tongue-like medial process, extending to middle of palpal tibia-tarsus; medial tongue with a pair of three-pronged spines basally, with sparsely scattered meth distally (Pl. II, 11). Chelicerae long, with seta dorsally at base of fixed digit; digits large, strong, subequal, each with recurved tip and one large tooth distally; fixed digit with pockets receiving tooth and tip of movable digit (Pl. II, 4).

Legs. Legs approximately equal in length to width of body, rough, pitted, with fimbriate growths. Leg I longest, II and IV subequal, leg III shortest; with short, leaf-like setae, except for several long simple setae at distal ends of tarsi and several specialized setae on tarsus I. Coxa I protected dorsally by rough lamella. Coxae I, II and III with two setae ventrally, coxa IV with one; two larger, leaf-like setae on ventral side of femur I and one dorsally on genu I; tip of tarsus I without pretarsus, but with clump of sensory setae and a long tactile seta; two stout setae with broom-like tips (Pl. I, 8) distally on tarsus I, one dorsal and one ventrolateral (Pl. III, 1 and 2). Pretarsi on legs II, III and IV; with long basal portion and a pair of stout, recurved claws; caruncle complex with conical projection ventrally between claws, tulip-shaped cushion dorsally, and a pair of retractable, drop-shaped structures distally (Pl. II, 7).

ADULT MALE, Plate IV. Body averaging $645 \times 460\mu$, similar in appearance to female. Some critical measurements are presented in Table II.

Venter. All ventral shields fused, but with areolate areas indicating positions of metapodal and anal shields. Sternal setae I and II and pores I as in female; sternal setae III equal to I and II, at level of anterior margins of coxae III, in line, diverging slightly posteriorly, with setae I and II, sternal pores II not observed; pseudosternal setae reduced, at middle of

coxae III, mediad to sternal setae III, anterior to genital aperture, flanked by pair of triple or quadruple pores like double pores of female. Genital opening small, round, between coxae III and IV; covered by two shields, the posterior larger than the anterior; surrounded by areolate area; flanked by sternal pores III. Metasternal setae small, at posterior border of genital aperture, on line with triple pores flanking pseudosternals. Opisthosomal chaetotaxy, metapodal pores, anal region, tritosternum and peritremes as in female (Pl. IV, 2).

Table II. *D. whartoni*, Measurements of the Male

Part measured	\bar{x}	<i>s</i>	Range observed
Body:			
length	646.85 μ	38.96 μ	603.52-732.32 μ
width	459.08	32.47	404.80-511.52
Genital aperture:			
length	41.45	2.88	38.50- 46.20
width	41.34	1.67	38.72- 43.56
Legs:			
I	500.11	32.29	463.68-558.44
II	470.86	20.91	443.44-510.60
III	422.00	23.75	391.00-464.60
IV	484.10	27.97	456.32-507.84
Chelicerae:			
fixed digit	107.93	—	—
movable digit	108.00	—	—

Dorsum. Dorsal chaetotaxy as in female. Shields, except marginals, as in female. Marginal shields differ from female in that inner marginal seta X is usually on shield fused with those of VI, VII, VIII and IX; shield XI usually enlarged, but separate; IV and V often fused with VI, etc., but pattern sometimes exactly as in female (Pl. IV, 1).

Gnathosoma, including chelicerae (Pl. II, 6) and *legs* exactly as in female, but proportionately smaller (Pl. IV, 1 and 2).

LARVA, Plate V. Body averaging 350 x 285 μ , more rounded anteriorly and posteriorly than other stages, gray-white in color. Some critical measurements are given in Table III.

Venter. Sternal shield elongate; with indistinct, irregular borders, distinguishable only by difference in texture from surrounding integument; bearing three pairs of sternal setae, simple, of moderate length; setae I on anterior corners, setae II on midlateral margins, setae III on posterior corners of shield. Anal shield corresponding to raised portion of female

anal shield, granular; lacking anterior adanal setae, but with long posterior adanal setae at posterior margins of anus and very long, whip-like postanal seta. Three pairs of setae between sternal and anal shields, possibly homologous with ventral setae I and II and metapodal setae II of adult; anterior and lateral setae short, spike-like; median setae simple, equal in length to sternal setae, usually on minute platelets. Soft integument covered with weakly sclerotized papillae, no striations. Metapodal shields lacking, tritosternum similar to that of adult, no stigmata or peritremes observed (Pl. V, 2).

Table III. *D. whartoni*, Measurements of the Larva

Part measured	\bar{x}	s	Range observed
Body:			
length	352.18 μ	30.21 μ	296.24-395.60 μ
width	287.04	21.30	252.08-326.60
Sternal shield:			
length	134.99	8.89	111.10-143.22
width	93.10	6.03	80.96-102.08
Legs:			
I	286.95	5.86	278.76-296.24
II	275.72	6.50	264.96-286.12
III	260.73	5.62	250.24-268.64
Chelicerac:			
fixed digit	67.66	—	—
movable digit	67.19	—	—
Setae:			
mastidorsales	117.17	—	longest 128.04
mastipedaes	74.40	—	longest 85.58

Dorsum. Dorsal shield with indistinct borders, distinguishable only by areolate texture; round, with elongate posterior projection and two midlateral, ear-like projections; without longitudinal furrow. One pair of short, stout setae anterior to shield, possibly homologous with first marginal setae or vertical setae of adult; five pairs of short, stout setae along midline of shield, where furrow occurs in adult, sixth pair similar, posterior and laterad to posterior projection of shield. Leaf-like, moderately long setae on anterolateral margins of shield; followed closely by long, whip-like setae equal in length to postanal seta; second pair of long, whip-like setae on ear-like, lateral projections of dorsal shield. Soft integument as on venter (Pl. V, 1).

Gnathosoma. Gnathosoma very similar to that of adult, except for lack of gnathosomal setae and one pair of hypostomal setae. Remaining pair of hypostomal setae appear to be median and distal setae; median setae lateral, indicating that these migrate medially and anteriorly with maturity. This may indicate that the median hypostomal setae of the

trachytine-uropodine mites are homologous with the lateral setae in the Gamasides (Pl. V, 1 and 2).

Legs. Legs rough, covered with papillae; without lamellae over coxae I, but with toothed ridges dorsally on proximal segments. Leg I lacking pretarsus, with long tactile seta and stout distal setae, but without broom-like tips; legs II and III with pretarsi as in adults. Ventral setae long, simple; dorsal setae long, simple or short, spiny; a long, whip-like seta, equal in length to adanal setae, dorsally on genu I and II and on tibia III (Pl. V, 1 and 2).

PROTONYMPH, Plate VI. Body averaging $455 \times 350\mu$, appearance similar to adult, white to yellowish-brown in color. Some critical measurements are given in Table IV.

Table IV. *D. whartoni*, Measurements of the Protonymph

Part measured	\bar{x}	s	Range observed
Body:			
length	455.49 μ	41.92 μ	407.56-540.04 μ
width	348.04	27.79	310.04-407.56
Sternal shield:			
length	162.38	3.43	157.96-167.20
width	105.67	6.30	99.22-118.80
Legs:			
I	353.28	6.93	345.00-363.40
II	334.97	10.18	319.24-350.52
III	304.34	9.68	291.64-326.60
IV	317.03	6.88	305.44-331.20
Chelicerae:			
fixed digit	80.85	-	-
movable digit	80.74	-	-

Venter. Ventral chaetotaxy as in larva; sternal shield areolate, extending from anterior margins of coxae II to posterior margins of coxae III, with distinct borders, truncate anteriorly, broadest at level of sternal setae II, very bluntly pointed posteriorly, pits granulated around sternal setae. Three pairs of sternal setae simple, of moderate length; sternal pores I in posterolateral corners of pits containing sternal setae I; pores II and III and metasternal setae apparently lacking. Anterior and median ventral setae simple, equal in length to sternal setae; lateral ventral setae small, leaf-like; two pairs of pit-bearing platelets, one between sternal shield and anterior ventral setae, the other on a line between anterior ventral and lateral ventral setae. Anal region basically as in larva, but with adanal and postanal setae small, leaf-like and areolate extension of anal shield

laterally and somewhat anteriorly around anal projection. Soft integument striated, tritosternum and peritremes as in adult; metapodal, parapodal, endopodal and peritremal shields absent (Pl. VI, 2).

Dorsum. Vertical setae and vertex similar to adult, but with fewer lamellae. Median dorsal shield rough, areolate, sagittate, with longitudinal median furrow; first inner marginal setae at anterior tip of shield, but very small and simple, similar to setae of furrow; four pairs of setae along median line of shield, flanking furrow; fifth and sixth pairs of furrow setae leaf-like, on small platelets, flanking narrow posterior extension of median dorsal shield. A pair of longitudinal, oval, aerolate shields, without setae, flanking narrow, posterior part of median dorsal shield, laterad to fifth and sixth furrow setae. Posterior dorsal shield areolate, small, without setae; a row of four leaf-like setae transversely between posterior dorsal shield and sixth furrow setae, homologues of four setae at end of median dorsal shield of adult. Marginal and terminal setae leaf-like as in adult; thirteen pairs of inner marginal setae, including anterior pair of simple setae on median dorsal shield, one pair of terminal setae, only four pairs of outer marginal setae; all marginal setae on individual platelets, anterior inner marginal platelets generally larger than others and all inner marginal platelets usually larger than outer marginal platelets. Soft integument striated as in adult (Pl. VI, 1).

Gnathosoma and *legs* generally similar to those of adult, but femur I with only one large leaf-like seta and coxa I not protected dorsally by rough lamella (Pl. VI, 1 and 2).

"DEUTONYMPH," Plate VII. Body averaging $575 \times 435\mu$, appearance similar to adult, yellowish-brown to brown in color. Some critical measurements are given in Table V.

Venter. Sternal shield similar to that of protonymph, but longer and less angular; with expanded oval "head" anteriorly bearing sternal setae I and pores I; broadest in region of sternal setae I and II. Sternal setae I, II and III approximately equal, of moderate length, slender, but leaf-like. Metasternal setae shorter than I, II, and III; pseudosternals shortest. Sternal setae I, II, III and pseudosternals on sternal shield; metasternal setae behind shield, at anterior margins of coxae IV, free in soft integument; sternal pores III on edges of shield, equidistant between and slightly mediad to pseudosternal and metasternal setae. Opisthosomal chaetotaxy similar to that of adult; with pair of pore-bearing platelets, probably homologous to same in protonymph and to metapodal pores of adults; all setae slender and leaf-like; first ventral setae free on soft integument, all others on small, areolate platelets; metapodal setae on largest platelets; ventral setae II, III and IV paralleling border of anal shield. Metapodal shields lateroventral,

areolate, relatively small, without setae. Anal shield extending anteriorly, longer than that of protonymph; with two pairs of adanal setae and a postanal seta. Peritremal plates present; peritremes and tritosternum as in adult (Pl. VII, 1).

Table V. *D. whartoni*, Measurements of the "Deutonymph"

Part measured	\bar{x}	s	Range observed
Body:			
length	575.46 μ	40.00 μ	515.20-630.20 μ
width	433.41	33.41	381.80-475.64
Sternal shield:			
length	220.99	9.00	211.20-238.48
width	109.56	4.12	102.30-117.26
Anal shield:			
length	105.18	18.34	78.10-133.76
width	154.04	13.95	140.36-188.10
Peritreme	54.54	3.52	47.74- 57.86
Legs:			
I	437.46	25.14	387.32-465.52
II	412.80	23.48	367.08-445.28
III	370.58	21.33	327.52-411.24
IV	401.76	22.02	365.24-444.36
Chelicerae:			
fixed digit	84.72	-	-
movable digit	94.91	-	-

Dorsum. Vertex and vertical setae as in adult. Median dorsal shield and lateral, oval dorsal shields similar to those of protonymph; median dorsal shield without lateral projections of protonymph. First marginal setae on median dorsal shield, leaf-like as in adult; longitudinal furrow flanked by five pairs of small, simple setae; fifth pair sometimes free or on small platelets; sixth pair of furrow setae leaf-like, on platelets at posterior margin of median dorsal shields, between median dorsal and lateral dorsal shields. Three pairs of minute setae on lateral margins of median dorsal, one pair on anterolateral margins of lateral dorsal shields. Posterior dorsal shield areolate, without setae, reaching between the outer pair of the four leaf-like setae in front of its anterior margin. Marginal and terminal setae leaf-like; thirteen pairs of inner marginal, one pair of terminal, and nine pairs of outer marginal setae as in adult; inner marginal platelets large, anterior ones often contiguous, tending towards fusion. Soft integument striated as in adult (Pl. VII, 2).

Gnathosoma and *legs* as in adult, but without rough lamella dorsal to coxa I (Pl. VII, 1 and 2).

"**TRITONYMPH**," Plate VIII. Body averaging 610 x 450 μ , appearance similar to adult, yellowish-brown to brown in color. Some critical measurements are presented in Table VI.

Table VI. *D. whartoni*, Measurements of the "Tritonymph"

Part measured	\bar{x}	<i>s</i>	Range observed
Body:			
length	609.59 μ	12.95 μ	587.88-632.96,
width	449.24	28.88	397.44-490.36
Sternal shield:			
length	230.65	6.20	219.34-240.90
width	110.51	5.19	104.50-119.46
Anal shield:			
length	186.54	5.27	179.30-192.06
width	162.51	6.73	146.96-172.26
Peritreme	153.82	7.38	135.52-164.12
Legs:			
I	463.96	16.05	431.48-479.32
II	441.32	13.04	414.00-456.32
III	397.62	13.00	372.60-413.08
IV	428.81	6.14	421.36-440.68
Chelicerae:			
fixed digit	86.77	—	—
movable digit	96.16	—	—

Venter. Ventral chaetotaxy and shields very similar to "deutonymph"; metapodal larger, leaf-like; anal shield longer, bearing ventral setae II and III besides setae anus with two pairs of simple adanal setae and a postanal seta. Anus surrounded by sclerotized ring as in phoretic nymphs of Uropodina and *Polyaspis*, in which an anal pedicel attaches mite to insect vehicle. Metapodal shields somewhat larger than in "deutonymph." Peritreme elongated, reaching to middle of coxa II (Pl. II, 10 and Pl. VIII, 1). Tritosternum as in adult (Pl. VIII, 1).

Dorsum. Vertex and dorsal chaetotaxy as in adult. Median, lateral and posterior dorsal shields fused to form a single shield; fifth and sixth pairs of furrow setae often on shield rather than in groove. Inner marginal shields II and III, IV and V, VII and VIII usually fused, all inner marginal platelets enlarged (Pl. VIII, 2).

Gnathosoma as in adult (Pl. VIII, 1 and 2).

Legs as in adult, except for pretarsi. Pretarsi of legs II, III and IV with large caruncle, lacking ventromedian pointed projection and anterior drop-like structures (Pl. II, 8 and Pl. VIII, 1 and 2).

Type specimens. The holotype female, slide 90-4, and allotype male, slide 90-13, are deposited in the collection of the Chicago Academy of Sciences. Paratype specimens, representing all stages described, will be deposited in the collections of the following institutions: The Chicago Academy of Sciences; The Chicago Natural History Museum; The United States National Museum, Washington, D. C.; The British Museum (Natural History) , London, England; Museum National d'Histoire Naturelle, Paris, France; Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium; Universitetets Zoologiske Museum, Copenhagen, Denmark; Rijksmuseum van Natuurlijke Histoire, Leiden, Holland; Riksmuseum, Stockholm, Sweden; Natal Museum, Pietermaritzburg, South Africa; and the South Australian Museum, Adelaide, South Australia. All type material has been selected from specimens collected from a single tree-hole population.

Type locality and type habitat. A basal tree hole in a basswood tree, *Tilia* sp., in Lake Avenue Woods, 2.5 miles north of Des Plaines, Illinois.

Biology of *Dyscritaspis whartoni*

During the autumn of 1952 and the spring of 1953, seven samples of tree-hole mold were collected. These were taken from a basal tree hole in a basswood tree which was located on a slope approximately thirty feet from the Des Plaines River in Lake Avenue Woods. This woods is one of the Cook County Forest Preserves 2.5 miles north of Des Plaines, Illinois at the intersection of County Route H and U.S. Route 45. The tree-hole opening measured 43 inches in height by 20 inches in width and the inside diameter of the cavity was approximately 30 inches. Mites were collected from the samples by means of Berlese funnels and among the thousands of mites obtained there were 440 specimens of *Dyscritaspis whartoni*. There were 63 females, 62 males, 68 larvae, 143 protonymphs, 78 "deutonymphs," and only 26 "tritonymphs" in these samples. At the times that the seven tree-hole samples were taken, collections were also made from other tree holes, from rotting logs, dead tree stumps, leaf mold, soil, mosses and the overflow debris from the tree holes. All of the tree-hole mold samples yielded *D. whartoni* in large numbers, but in only one case was this species obtained from any of the other habitats sampled: a female and a "deutonymph" were taken from a rotting log less than five feet from the type habitat. Even the overflow debris at the openings of the tree holes yielded no specimens of this species. Thus it appears that *D. whartoni* is restricted to the tree-hole microhabitat. This observation apparently is confirmed by the studies of Drs. Orlando Park and Stanley Auerbach. In a continuation of studies on the ecology of the

tree-hole microhabitat, they have found *D. whartoni* to be a very common species in a beech tree hole in Warrens Woods at Lakeside, Michigan, whereas samples from other microhabitats in this same area have yielded none of these mites.

If *D. whartoni* is truly specific to the tree-hole habitat, the question of how this mite migrates presents itself. The tree-hole habitat, as described by Park, Auerbach and Corley (1950) , is part of a dynamic complex and not a static habitat. How, then, do these mites get from a tree hole that is passing into the decaying-log microsere to another tree hole?

A study of the morphology of the large series of specimens of *D. whartoni* revealed that there are three distinct nymphal stages in this species. The protonymph is easily distinguished from the other stages by its smaller size and other structural differences which have been discussed in the description of the species. The "deutonymph" and "tritonymph" are almost the same size and are very similar structurally, so that it was difficult to determine, without actual data on the life history, which was the second and which was the third nymphal stage. Attempts have been made to answer this question by rearing nymphs, but thus far the results have been unsatisfactory. The mites have been kept alive for more than a month on tree-hole mold at 95 per cent R.H., but none have moulted or exhibited any other apparent signs of development.

The "tritonymph" differs from all other stages in the length of the peritreme, the structure of the caruncles of legs II, III, and IV, and in the presence of the sclerotized perianal ring. It differs from the "deutonymph" in the shape and number of dorsal shields, but it is similar to the "second" nymphal stage in its general morphology and in the specific structure of the sternal shield and the chaetotaxy of the ventral surface. The "tritonymph" and "deutonymph" are similar in size, and there is considerable overlap in the range of size variation in the two stages, but the "tritonymph" is, on the average, slightly larger than the "deutonymph."

It may be logically argued that these differences are nothing more than indications of sexual dimorphism in the second nymphal stage. The nymphs that have been referred to as "deutonymphs" would then be deutonymph males and those that have been called "tritonymphs," because of their greater size, would be deutonymph females. If this interpretation were correct, one would expect the ratio of deutonymph males and females to approximate that of the adult males and females. An examination of the randomly collected series of 440 specimens, reveals that the ratio of adult males to females is approximately 1:1 and the ratio of "deutonymphs" to "tritonymphs" is 3:1. Such a difference, even without statistical analysis, is obviously significant.

The long peritremes and the cup-like caruncles of the "tritonymph" suggest the possibility that the specific microhabitat niche or the behavior patterns of this stage may be different from those of the other stages of the mite. The sclerotized perianal ring is similar to that found on some of the migratory nymphs of the uropodine mites that are attached to their insect hosts by means of an anal pedicel. Although no such structure was found on any of the "tritonymphs" of *D. whartoni*, a single trachytine nymph has been taken on a passalid beetle from White County, Arkansas, attached to its insect vehicle by means of a typical uropodine anal pedicel. This mite is obviously a member of the closely related genus *Polyaspis*. Berlese (1882) has also figured such an anal pedicel on the nymph of *P. patavinus*. This is further evidence of the extremely close relationship between the cohorts Trachytina and Uropodina.

From the foregoing evidence, indirect as much of it is, a possible answer to both the reason for the comparatively small number of "tritonymphs" found and for the problem of how *D. whartoni* migrates from tree hole to tree hole can be deduced. In all stages *D. whartoni* is a heavy-bodied, slow-moving mite and it is difficult to imagine it traveling from one tree hole to another under its own power, especially if, as it appears, it is specific in its physiological or behavioral requirements to the conditions found in the tree-hole habitat. If the "tritonymph" stage is phoretic, then the problem of transportation of the species from an unfavorable to a favorable habitat is solved. Phoresy could also explain the comparatively small number of "tritonymphs" found in the tree hole if these nymphs usually attach themselves to transient beetles or other arthropods which would not likely be found in the berlesate of tree-hole mold samples. These deductions are, of course, speculative and require confirmation by actual observation.

It will be noted that the terms "deutonymph" and "tritonymph" have been set off by quotation marks, indicating that the application of these terms is conditional and that it is not certain that they have been applied correctly.

In the cohort Uropodina, a group that is closely related to the trachytines, it is generally accepted that it is the deutonymph that is phoretic. It could be expected, therefore, that the phoretic stage of *D. whartoni* would also be the deutonymph, not the tritonymph. It should be emphasized, however, that although there is general agreement that it is the second nymphal stage that exhibits phoresy in the uropodines, this has never been conclusively demonstrated by detailed life history studies. If such studies should prove the validity of this view, it does not necessarily follow that a generalization can be made to include the trachytine mites in this life history pattern, or even all of the Uropodina. Too little is known concerning the biology of these forms.

The reasons for concluding that the phoretic form is the later stage in *D. whartoni* are several, but none of these reasons can be regarded as conclusive with the data at hand. The marginal platelets of the dorsum exhibit a progressive change from small individual platelets in the protonymph to an enlargement of these platelets in the "deutonymph" to a fusion of some of the platelets in the "tritonymph" and greater fusion in the adult. This has the appearance of a developmental pattern, but it may be logically argued that the greater sclerotization in the "tritonymph" is merely an adaptation, correlated with the phoretic habit, that perhaps makes this form better able to resist desiccation. The picture is further complicated by the fact that, although a similar progressive pattern of increased sclerotization may be followed with regard to the median, lateral, and posterior dorsal shields, this development appears to have progressed farther in the "tritonymph" than in the adult.

Ventrally, the chaetotaxy and the sternal shields of the two nymphal stages in question are almost identical. The anal shield, the peritremes, and the peritremal plates of the "deutonymph" are more nearly similar to their counterparts in the adult than are those of the "tritonymph." As it has been previously pointed out, the modifications of the anus and the peritremes of the "tritonymph" are probably correlated with the phoretic habit and it is logical to assume that the sclerotization surrounding these structures bears the same correlation. It might be further emphasized that, with regard to these characters, even the protonymph more closely resembles the adult than does the "tritonymph." Therefore, the apparent similarity in the ventral shields of the "deutonymph" and the adult can have little bearing in deciding which of the nymphal forms is the second and which the third nymphal stage.

A third criterion, body size, may be applied in differentiating between the two stages. This, although suggestive, is also inconclusive. The "tritonymph" is, on the average, 35μ larger than the "deutonymph." The smallest "deutonymph" observed was 73μ smaller than the smallest "tritonymph," but the largest "tritonymph" was only 3μ larger than the largest "deutonymph."

A further question may be raised as to whether or not the so-called "tritonymph" is actually a member of the species, *D. whartoni*. In all of the collections of tree-hole mold made north of North Carolina, *D. whartoni* was the only polyaspid mite present. In almost every case, although fewer in numbers than the other stages, "tritonymphs" were found. There were no other species present into which these nymphs could be placed. It is, therefore, fairly certain that the "tritonymph," different as it may be in some respects, is a member of *D. whartoni*. This conclusion is substantiated by the fact that in the tree-hole mold samples from Louisiana and

Mississippi, the *Polyaspis* sp. discussed earlier was the only member of the Polyaspididae recovered and a "tritonymph" stage was also present in these collections.

It may be satisfactorily concluded, on the basis of the available data, that the "tritonymph" is a member of *D. whartoni* and that the two nymphal forms in question are not merely male and female of the same stage. The patterns of development apparent in the dorsal shields of the various stages and the size differences between the "deutonymph" and the "tritonymph" seem to suggest that the designations used in this paper are probably valid. However, these data are not conclusive and some question remains as to which is actually the deutonymph stage and which the tritonymph.

Other alternative solutions cannot be entirely ruled out. For example, it is conceivable that the phoretic form is not obligatory in the life histories of these and related mites. Perhaps the protonymph passes into the normal "deutonymph" or the phoretic "tritonymph" stage depending upon certain environmental or physiological conditions which are not yet understood. Thus, the "deutonymph" and "tritonymph" may actually be a non-migratory deutonymph and a phoretic deutonymph. Instead of three nymphal stages in the usual sense, there would then be the protonymph and two alternative deutonymphs with no true tritonymph. Other possibilities, of course, are still extant.

Obviously, the questions raised can be solved only by careful and detailed investigations into the life histories of these animals and the foregoing discussion merely points up the appalling lack of such data.

Although no eggs were found either in the tree-hole mold or in the bodies of females collected during the winter and early spring, females collected from May through August were each found to contain several eggs. Thus *D. whartoni* is apparently oviparous, but probably does not produce eggs during the colder months.

POLYASPIDAE

It has already been noted that Trägårdh, in distinguishing the families of the cohort Trachytina, relied almost entirely upon the variations in the metasternal setae and shields and in the epigynial shield. A study of the four genera, *Polyaspis*, *Dipolyaspis*, *Calotrachytes* and *Dyscritaspis*, of the family Polyaspididae has revealed that these characters, although valuable in distinguishing between genera, are of little value for family diagnosis. It has also been demonstrated that Trägårdh's diagnosis of the family Polyaspididae was apparently based upon a single genus, *Dipolyaspis*, and cannot be applied to the type genus of the family, the genus *Polyaspis*.

This study has further revealed that the four genera of the family Polyaspididae have many characters that are common to each and which distinguish them from the other mites of the cohort Trachytina. These characters can best be presented in the form of a revised and expanded family diagnosis.

Family Polyaspididae Berlese, 1918

Diagnosis. Epigynial shield of female without distinct articulation to ventral shield (i.e., texture of shields different, but no separating line of soft integument) or completely surrounded by perigenital rim. Metasternal setae lateral to genital aperture, on minute rounded or small elongate metasternal shields, or on posterolateral corners of epigynial shield. Posterior margin of sternal shield raised as a perigenital rim bordering three sides or completely surrounding genital aperture; rim bearing sternal setae III and pseudosternal setae. Male genital aperture small, round, between coxae III and IV, closed by two plates, posterior usually larger than anterior. Anus on rudder-like projection, with two pairs of adanal setae and a postanal seta. Tritosternum with broad, triangular base and a tree-like, branched lacina. Dorsum with fragments of nymphal skins adhering to shields. Cheliceral digits subequal or fixed digit slightly longer than movable digit, with hooked tip; with pockets in fixed digit receiving opposing teeth of movable digit; corniculi long, blade-like, usually heavily sclerotized. Palpal tibiae and tarsi insensibly fused; specialized palpal sensory setae with two tines. Legs rough, fimbriate; leg I lacking pretarsus and claws.

Type genus: *Polyaspis* Berlese, 1881.

Trägårdh (1942) presented a very convincing picture of the disappearance of the metasternal shields and setae of the Uropodina in which the Polyaspididae were considered to be a significant link. In his presentation, Trägårdh traced the gradual retrogressive development of the metasternal shields through the Trachytina, from *Trachytes* through *Polyaspinus* to the primitive Uropodina, to their ultimate disappearance in the higher Uropodina. The development of these shields in the Polyaspididae, from *Dipolyaspis* through *Polyaspis* to *Dyscritaspis*, suggests that it might prove extremely interesting to investigate the Uropodina thoroughly for evidences of fusion of the metasternals with the epigynial shield prior to the disappearance of the metasternal setae. Such evidences might possibly indicate a diphyletic origin of the uropodine mites.

Although data concerning the geographic distribution of the Polyaspididae are still quite meager, a summary of these data may be of interest from an ecological and zoogeographical standpoint. The genus *Polyaspis*, according to the evidence available, appears to be the most

widely dispersed of the four genera. It occurs in southern Europe, in the Mediterranean countries, and in tropical and subtropical America, having been collected in the United States as far north as Arkansas and North Carolina, also in Florida, Louisiana, Mississippi, and at San Esteban, Venezuela. Berlese (1917) described a species, *P. platensis*, from Argentina and another (Berlese, 1911) , *P. australis*, from Australia and Java. The latter species, however, was based on nymphal specimens and must be considered with caution. Trägårdh (1942) also referred to specimens of this genus from Natal and Zululand in Africa, but these have never been described.

From North Carolina northward, the genus *Dyscritaspis* appears to succeed *Polyaspis* in North America, having been collected from North Carolina to Missouri and north to Ottawa, Canada. All specimens collected appear to be one species, *D. whartoni*.

In northern Europe, *Dipolyaspis* appears to parallel *Dyscritaspis*. *Calotrachytes* has been recorded only from New Zealand.

TRACHYTIDAE

The family Trachytidae was erected by Trägårdh (1938) for the genus *Trachytes* Michael, 1894. At that time the family was considered to be monogeneric. In 1941 Trägårdh suggested that, on the basis of Berlese's figures which showed a pair of structures that could be interpreted as elongate metasternal shields, the genus *Uroseius* Berlese, 1888, was probably closely related to *Trachytes*. At the same time he also suggested that the genus *Neoseius* Oudemans, 1903, should be included along with *Uroseius* as a trachytid genus. Baker and Wharton (1952) , with some reservations, have included these genera, *Uroseius* and *Neoseius*, along with *Trachytes* as members of the family Trachytidae.

Gorirossi's drawings and data on Berlese's specimens of *Uropoda acuminata* Koch, 1847, the specimens on which Berlese based the genus *Uroseius*, have revealed that the structures interpreted by Trägårdh as metasternal shields are not present and that the genital area is, in fact, rather typically uropodine, without metasternal shields of any kind. Furthermore, the stigmata are at the level of the anterior margins of coxae III and the dorsum is apparently smooth, without the usual longitudinal furrow of the trachytines or the adherent nymphal skins. The tritosternum is broad-based, with a polyaspid-like lacina, and is not covered by coxae I, but that is also true of some other forms that are considered to be members of the Uropodina. Tarsus I lacks the pretarsus as in the Polyaspididae, but that too is characteristic of other typically uropodine species. This species is in need of a much more thorough study before it can be classified with

accuracy, but the characters discussed suggest that it should perhaps be placed in the uropodine family Discourellidae and that it is not a member of the cohort Trachytina.

The genus *Neoseius* Oudemans, 1903, which was based on the nymph of *Uroseius novus* Oudemans, 1902, was placed in the family Trachytidae by Trägårdh at a time when only the nymphal stage was known. Neumann and Sellnick (1950) discovered and described the adult female and other stages of this mite. Their description and figures indicate that this form also is not a trachytine, but a uropodine species. The median dorsal shield is relatively smooth, showing muscle attachments, and lacks the longitudinal furrow and adherent nymphal skins. There are no indications of free metasternal shields and sternal setae I appear to be lacking as in the genus *Eutrachytes*. The tritosternum is of the typical uropodine type with three lacinae and the authors have stated that although the first coxae are separated on prepared specimens, they appear as if they may have been contiguous in life. The epigynial shield extends beyond the anterior margin of the sternal shield; metapodal lines, but not metapodal shields are present; and the stigmata open at the level of the middle of coxae II. These are all uropodine, not trachytine, characters. The genus *Neoseius* appears to be most closely related to the uropodine genus *Eutrachytes* Berlese, 1914. It is suggested that it should be placed as a second genus in the family Eutrachytidae Trägårdh, 1944, differing from *Eutrachytes* in that it possesses a separate anal shield and the dorsal marginal shields apparently do not completely surround the posterior dorsal shield.

The genus *Trachytes*, the type genus of the family Trachytidae, remains, for the moment, as the only genus in that family. Much confusion exists in the literature with regard to the designation of the type species of the genus *Trachytes*. Both *Celaeno aegrota* Koch, 1847, and *Trachynotus pyriformis* Kramer, 1876, may be found listed with equal frequency. The confusion seems to have arisen out of the fact that Michael, in proposing the name *Trachytes* in 1894, failed to designate the type species of the genus. Michael proposed the name *Trachytes* as a nomen novum to replace the two junior homonyms, *Celaeno* and *Trachynotus*, both of which were preoccupied. In his discussion of the problem, Michael indicated that the genus *Celaeno*, as used in the Acarina, was an oribatid genus and that Koch was in error in placing his species in that genus. *Celaeno aegrota* was not the type species of that genus. At the same time, Michael stated that *T. pyriformis* was the type of the genus *Trachynotus* and that he had selected the name *Trachytes* because it was the closest available name to Kramer's *Trachynotus*. It may be interpreted that Michael, in effect, transferred *C. aegrota* from the genus *Celaeno*, where it had been placed in error, to the genus *Trachynotus*. He then replaced the junior homonym *Trachynotus* with *Trachytes*, which automatically took the type of

Trachynotus. Therefore, the type species of *Trachytes* is *Trachynotus pyriformis* and not *Celaeno aegrota*, even though the latter is the older name.

The family Trachytidae is distinguishable from the Polyaspidae on the basis of the majority of the characters presented in the diagnosis of the latter family. The characters of the Trachytidae can best be summarized in the form of an expanded family diagnosis.

Family Trachytidae Trägårdh, 1938

Diagnosis. Epigynial shield of female with distinct articulation to ventral shield. Metasternal setae lateral to genital aperture, on narrow elongate or reduced rounded * metasternal shields. Perigenital rim absent. Male genital aperture small, round, between coxae IV or coxae III and IV, closed by two plates, anterior much larger than posterior. Anus on a projection, with two pairs of adanal setae, but usually no postanal seta. Tritosternum with broad, usually oblong base and two distinct lacinae, sometimes with sub-branches. Dorsum entirely covered or with fragments of nymphal skins. Fixed cheliceral digit with hatchet-like tip, almost one-third longer than movable digit; corniculi relatively short, little longer than broad. Palpal tibia and tarsus distinctly articulated; palpal sensory seta with two tines. Legs relatively smooth, without fimbriate growths; leg I with a pair of small, strong claws.

Type genus: *Trachytes* Michael, 1894.

POLYASPINUS

The family Polyaspinidae was proposed by Trägårdh in 1941 for *Polyaspinus cylindricus* Berlese, 1917b. This proposal was based primarily on the character of the minute metasternal shields found in the genus *Polyaspinus*. The genus *Polyaspinus* Berlese, 1917, is readily distinguished from the genus *Trachytes* Michael, 1894. Members of *Trachytes* have a pyriform body; a trapezoidal epigynial shield flanked by elongate meta-sternal shields in the female; the male genital aperture is located between coxae IV; the anal shield is usually entire, extending the width of the opisthosoma; and the dorsal, lateral marginal shields are usually fused. In *Polyaspinus* the body is elongate oval, but pointed anteriorly; the epigynial shield is oval with a truncate posterior margin; the metasternal shields are much reduced or almost lacking; the male genital aperture is slightly forward between coxae III and IV; the anal shield surrounds only the anus and its associated setae, but is flanked by a pair of large adanal shields; and the lateral marginal setae of the dorsum are usually located on separate platelets.

*See section on the genus *Polyaspinus* Berlese, 1917.

A study of the characters that can be used in distinguishing between the genus *Trachytes* and the genus *Polyaspinus* reveals that the differences between these genera are no more significant than the variations occurring among the genera of the family Polyaspididae. It may be noted furthermore that the similarities are great and that, with the modification to accommodate the reduced metasternal shields of *Polyaspinus*, the diagnosis given for the family Trachytidae is as well suited to the genus *Polyaspinus* as it is to the genus *Trachytes*. Again the size of the metasternal shields, a character used by Trägårdh to separate the families of the cohort Trachytina, appears to be of generic significance only. It is proposed, therefore, that the genus *Polyaspinus* be transferred in the taxonomic scheme to become the second genus in the family Trachytidae.

COHORT TRACHYTINA

The mites of the families Trachytidae and Polyaspididae have many characters in common which also serve to distinguish them from other groups of Mesostigmata. These characters may be summarized in a diagnosis of the cohort Trachytina.

Cohort Trachytina Trägårdh, 1938

Diagnosis. Tritosternum with broad, short base, not concealed by coxae I. Stigmata located between coxae III and IV or opposite coxae III, no coxal grooves. Metasternal shields of female free, lateral to genital aperture, or fused with posterior angles of epigynial shield. Epigynial shield of the uropodine type, usually without *genital* setae. Male genital aperture small, round, between coxae III and IV or coxae IV. Chelicerae long, slender, of the uropodine type. Dorsum rough, with adherent nymphal skins. Median dorsal shield with a longitudinal median furrow.

The method outlined by James (1953) as an "objective aid in determining generic limits" was applied to the six genera of the Trachytina as an aid in the determination of the familial limits. Fifteen comparable characters were utilized. The results of this test indicated that *Trachytes* and *Polyaspinus* are comparatively closely related, being separated from each other by only four points. These two genera were separated from the nearest remaining genus, *Dipolyaspis*, by twelve points. *Calotrachytes* and *Dipolyaspis* appeared to be closely related, as did *Polyaspis* and *Dyscritaspis*, whereas these two groups were separated by a somewhat wider gap of seven points. As indicated by this method, the family Polyaspididae might be logically subdivided into two subfamilies, but at this time such a division would probably contribute more confusion than

order to the taxonomic picture. It should be emphasized that this method, at least as it was applied in this case, is not immune to bias and cannot be construed as proof of the relationships indicated. However, taken merely as an objective aid, as James clearly pointed out, the results do tend to indicate group limits and, therefore, they lend some support to the taxonomic conclusions drawn in this paper.

The two families and six genera of the cohort Trachytina may be distinguished with the aid of the following key.

**KEY TO THE FAMILIES AND GENERA OF THE COHORT TRACHTYTINA
BASED ON THE FEMALE**

- 1 Legs I without claws; corniculi long, blade-like; chelae with fixed and movable digits subequal or with fixed digit slightly longer than movable digit and with hooked tip; palpal tibiae and tarsi insensibly fused; epigynial shield of female partly or entirely surrounded by perigenital rim and usually not distinctly articulated to venter; tritosternum with broad triangular base and tree-like branched lacina; postanal seta present Family Polyaspididae 2
- Legs I with small claws; corniculi relatively short, almost equilateral; chelae with fixed digit almost $\frac{1}{3}$ longer than movable digit; palpal tibiae and tarsi articulated; epigynial shield of female distinctly articulated; perigenital rim absent; tritosternum with broad, usually oblong base and two lacinae, often sub-branched; postanal seta lacking Family Trachytidae 5
- 2 Metapodal shields fused medially, forming one shield across venter;
 - perigenital rim completely surrounding epigynial shield 3
 - Metapodal shields large, but separate from each other; perigenital rim on anterior and lateral margins of genital aperture only 4
- 3 Anal shield large, separate from metapodals Genus *Dipolyaspis*.
 - Anal shield fused with metapodals, forming a single ventral opisthosomal shield Genus *Calotrachytes*.
- 4 Metasternal shields reduced, but free, near posterior corners of epigynial shield; tritosternum with three branched lacina Genus *Polyaspis*.
 - Metasternal shields fused with posterior angles of epigynial shield, so that epigynial shield bears a pair of setae and pores; tritosternum with five-branched lacina Genus *Dyscritaspis*.

- 5 Body pyriform; metasternal shields narrow, elongate, flanking genital aperture; epigynial shield trapezoidal; dorsal marginal shields entire; dorsum covered by nymphal skins

Genus *Trachytes*.

Body oval, pointed anteriorly; metasternal shields usually reduced, rounded, at posterior corners of genital aperture; epigynial shield ovoid, truncate posteriorly; dorsal marginal setae on individual platelets; dorsum with fragments of nymphal skins on shields only Genus *Polyaspinus*.

ABSTRACT

The family Polyaspididae Berlese, 1918, and its four genera (*Polyaspis* Berlese, 1881; *Dipolyaspis* Berlese, 1917; *Calotrachytes* Berlese, 1917; and *Dyscritaspis* new genus) are diagnosed and their geographic distribution is briefly noted.

A new species, *Dyscritaspis whartoni*, is described in all stages: adult female and male, larva, protonymph, "deutonymph," and "tritonymph." Observations on the biology of this species are included.

The genera *Uroseius* Berlese, 1888, and *Neoseius* Oudemans, 1903, are shown to be non-trachytine and it is suggested that they be placed in the uropodine families Discourellidae and Eutrachytidae respectively.

The family Trachytidae Trägårdh, 1938, is revised and it is proposed that the genus *Polyaspinus* Berlese, 1917, be placed in that family along with the genus *Trachytes* Michael, 1894, because the characters used to distinguish these two genera appear to be of no greater significance than those used to separate the four genera of the Polyaspididae.

The cohort Trachytina Trägårdh, 1938, is redefined and a key is presented for the identification of the two families and six genera.

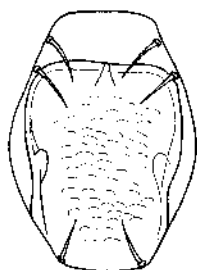
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PLATES I - VIII

PLATE I

1. Epigynial shield and perigenital rim of *Polyaspis patavinus*. (after Berlese, 1882)
2. Epigynial shield and perigenital rim of the second species of *Polyaspis* used by Berlese in his description of *P. patavinus*. (after Berlese, 1882)
3. Sterni-genital region of the holotype specimen of *Polyaspis patavinus*. (Drawing by Flora E. Gorirossi)
4. Sterni-genital region of *Polyaspis* sp. from Portugal.
5. Sterni-genital region of Trägårdh's "*Polyaspis* sp." (after Trägårdh, 1938)
6. Sterni-genital region of *Dipolyaspis sansonei*.
7. Stout seta of tarsus I of *Polyaspis* sp.
8. Stout seta of tarsus I of *Dyscritaspis whartoni*.



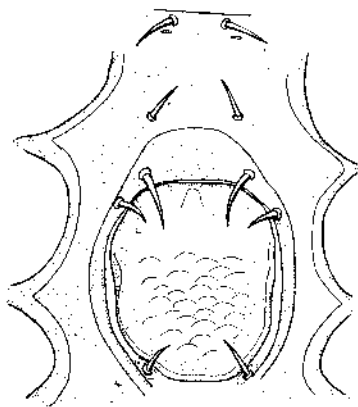
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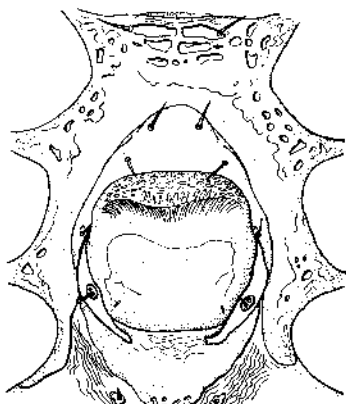
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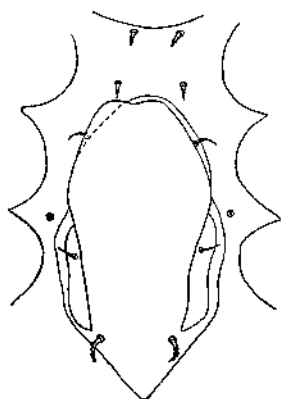
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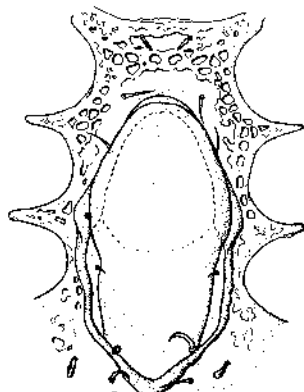
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PLATE II

Dyscritaspis whartoni new species

1. Diagram of body shape, left lateral view
2. Diagram of body shape, dorsal view
3. Diagram of body shape, transverse section behind coxae IV.
4. Right chelicera of female, right lateral view.
5. Sterni-genital region of female, showing sternal shield, with perigenital rim, and epigynial shield
6. Right chelicera of male, left lateral view.
7. Pretarsus IV of female, ventral view.
8. Pretarsus IV of "tritonymph," ventral view.
9. Peritreme of female.
10. Peritreme of "tritonymph."
11. Tectum of female, at anterior edge of gnathosomal base, dorsal view.
12. Gnathosoma of female, chelicerae removed, ventral view.
13. Dorsal marginal setae of female, lateral, cross-sectional and dorsal views.
14. Perigenital rim and genital aperture of female, with epigynial shield removed in order to show median shield.

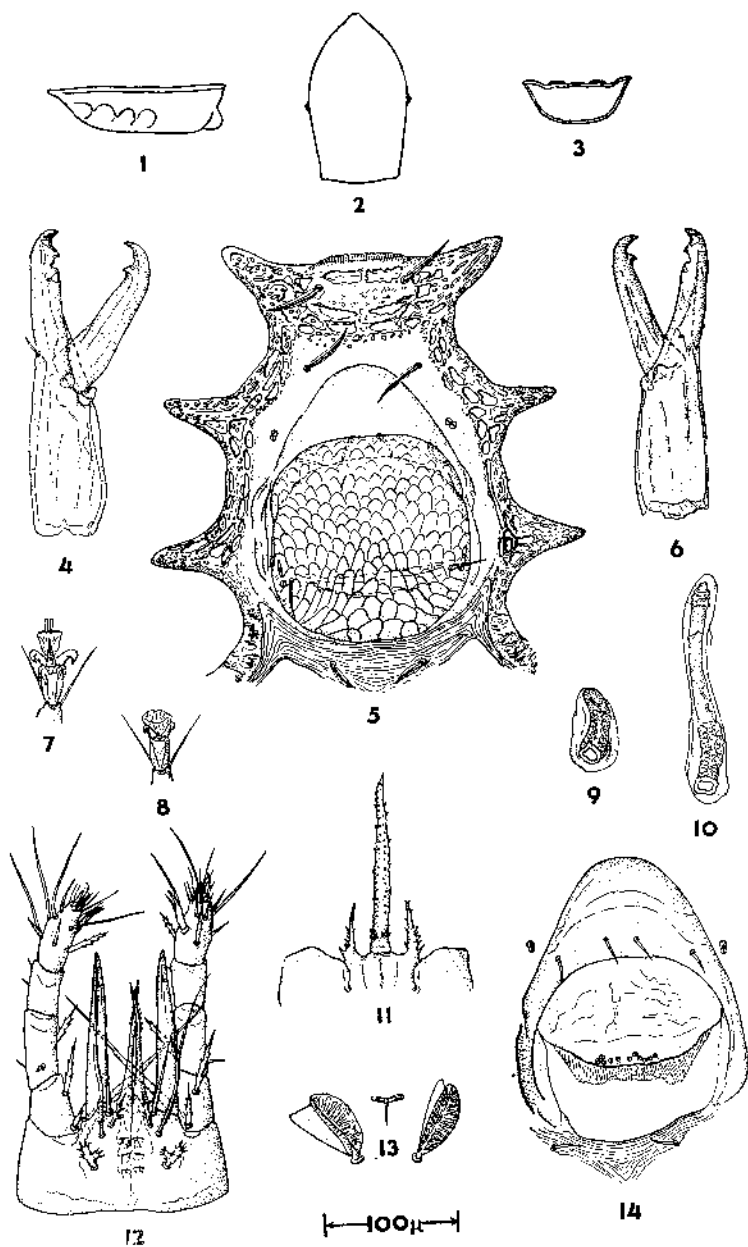
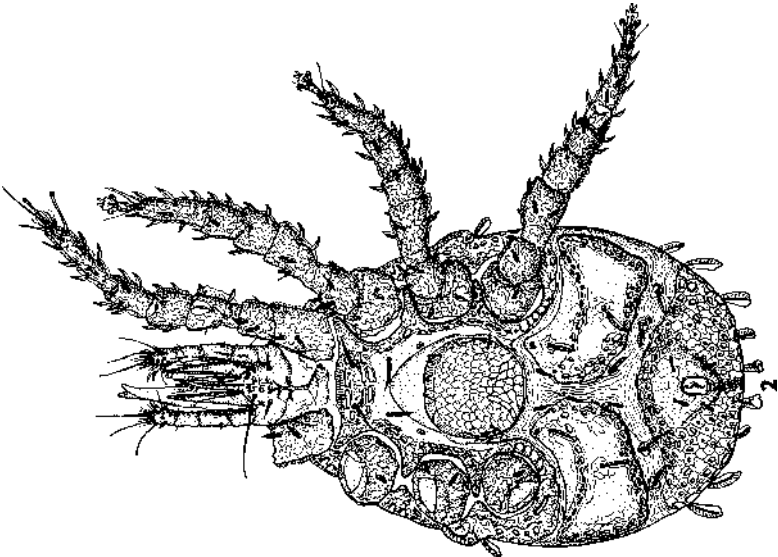


PLATE III

Dyscritaspis whartoni

1. Adult female, dorsal view.
2. Adult female, ventral view.



100μ

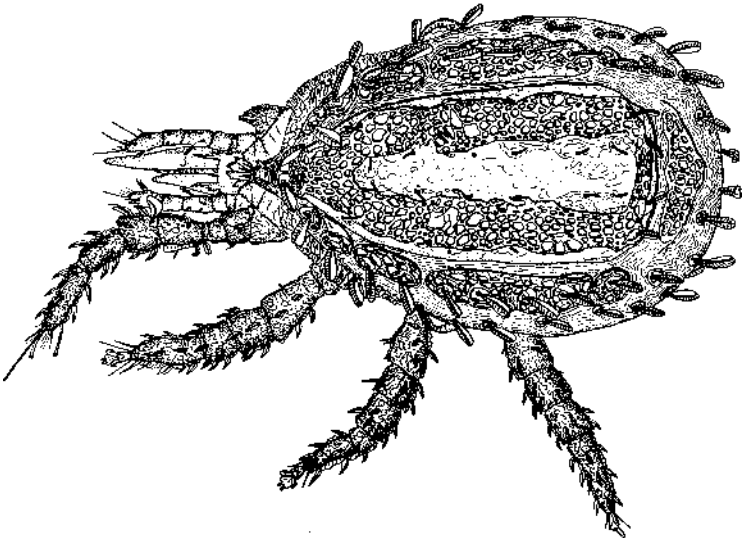
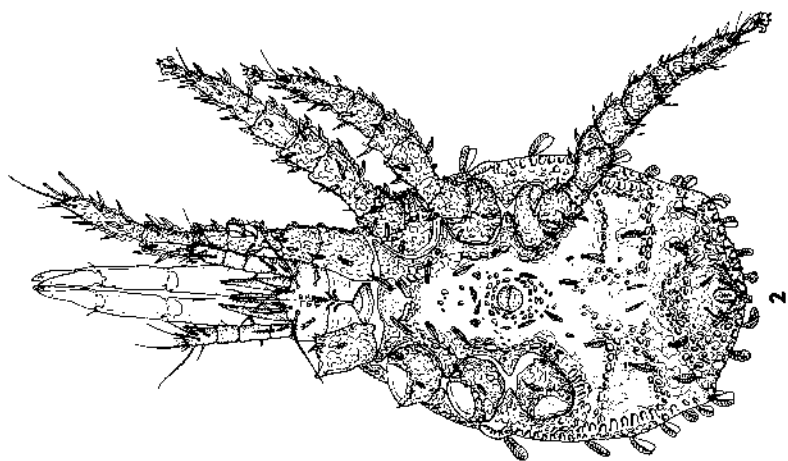


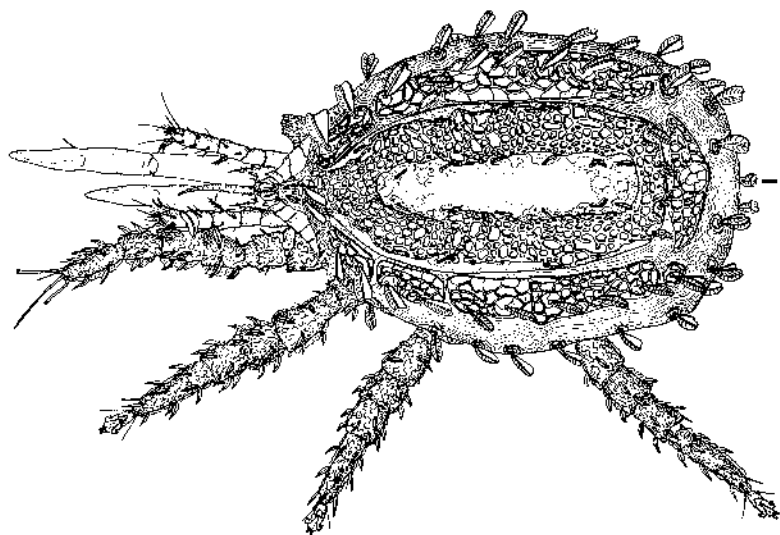
PLATE IV

Dyscritaspis whartoni

1. Adult male, dorsal view
2. Adult male, ventral view.



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PLATE V

Dyscritaspis whartoni

1. Larva, dorsal view.
2. Larva, ventral view.

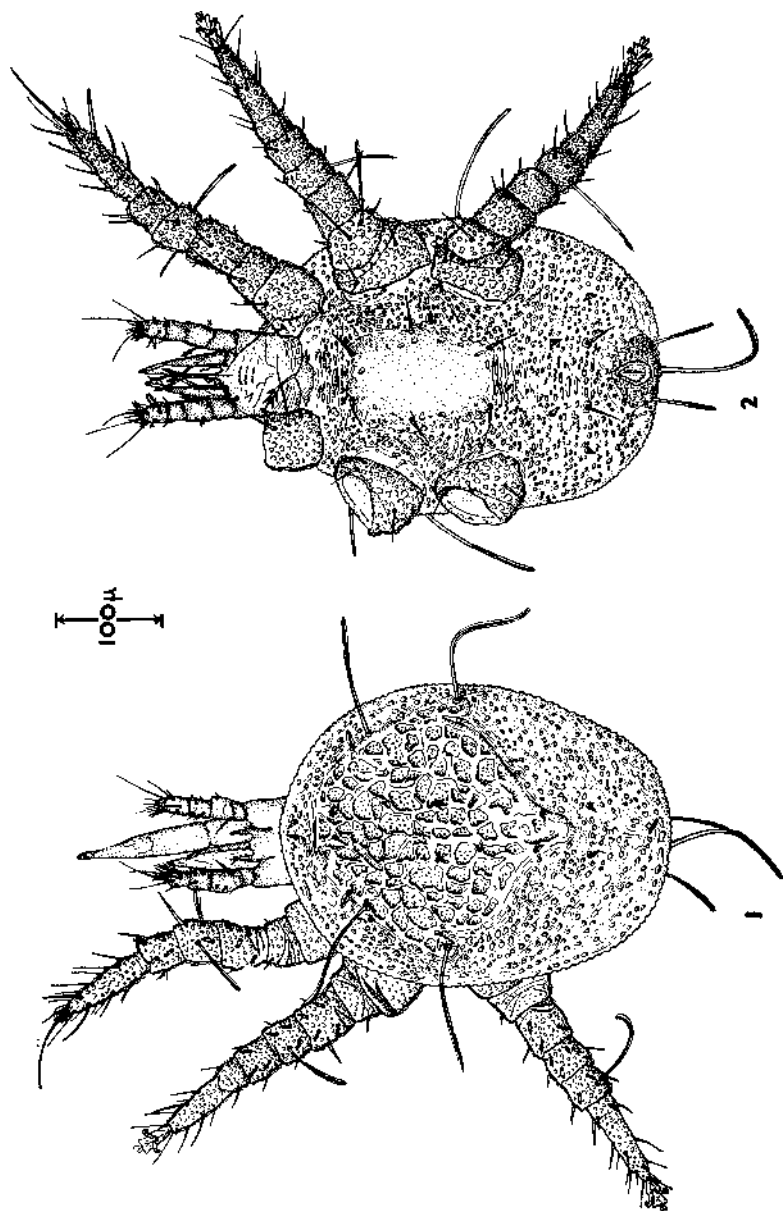
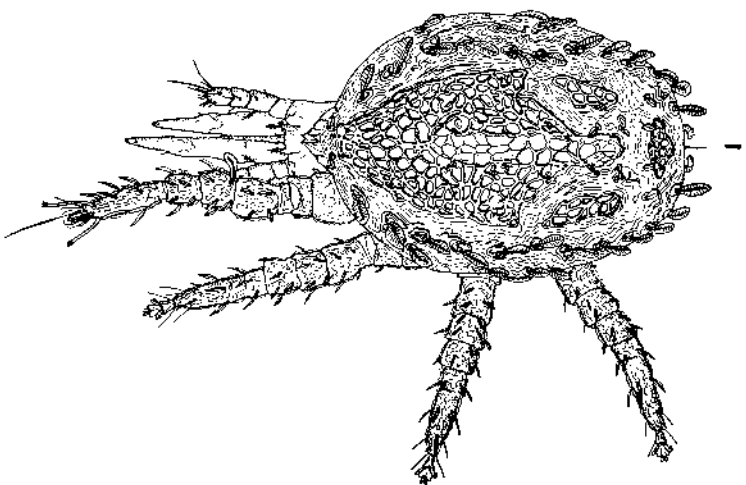


PLATE VI

Dyscritaspis whartoni

1. Protonymph, dorsal view.
2. Protonymph, ventral view.



100μ

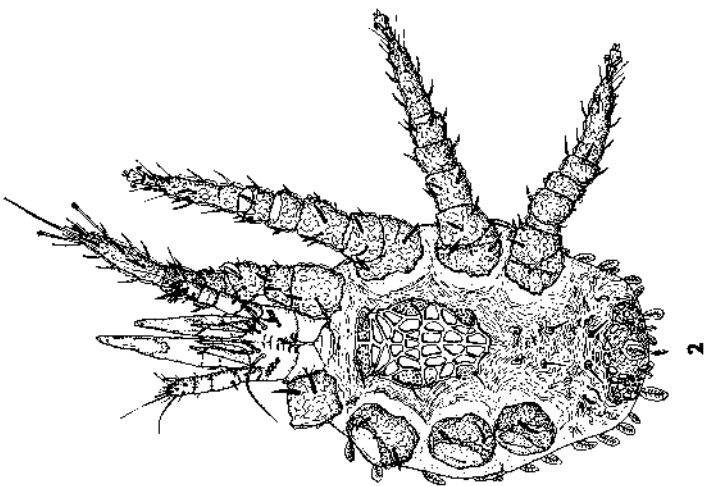
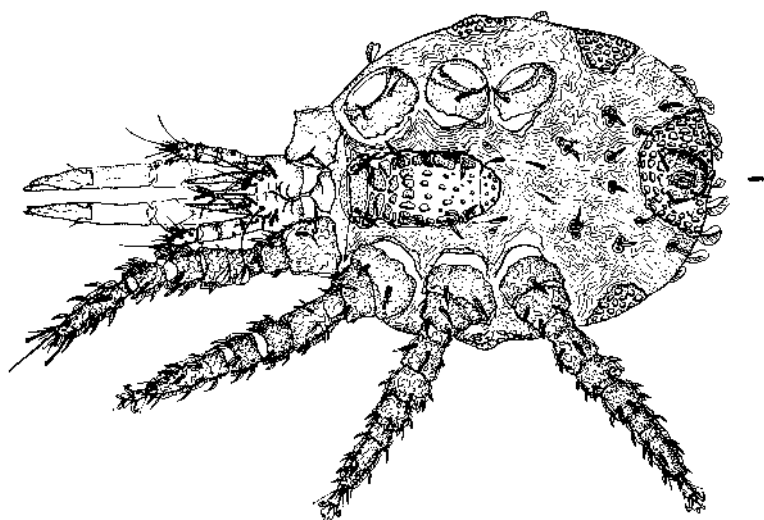


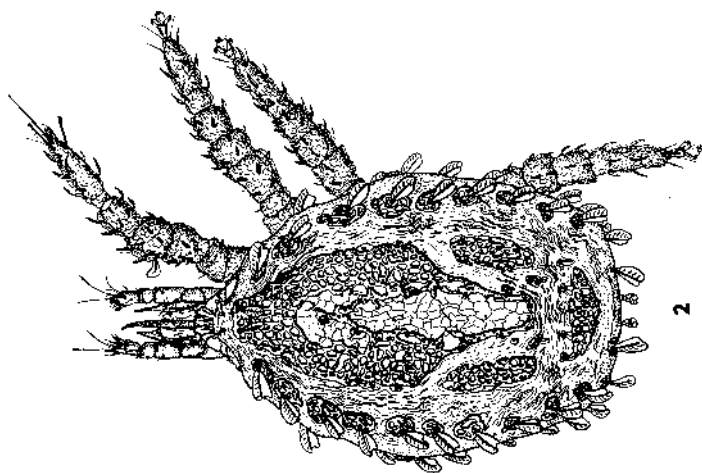
PLATE VII

Dyscritaspis whartoni

1. "Deutonymph," ventral view.
2. "Deutonymph," dorsal view.



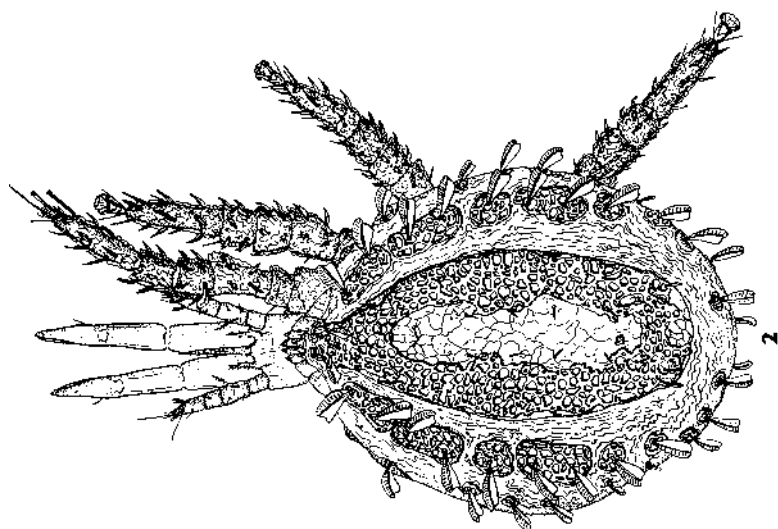
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P L A T E V I I I

Dyscritaspis whartoni

1. "Tritonymph," ventral view.
2. "Tritonymph," dorsal view.



100μ
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